BATTLE STAFF OPERATIONAL LEVEL TRAINING FRONT END ANALYSIS (FEA)

Mar 2012

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Front End Analysis Overview

- Combatant Commander (CCDR) training Front End Analysis (FEA) to determine the way ahead for replacing the legacy aggregate theater level Joint training tool.
- Requirement for a Joint Operational Competitive Wargame to replace the antiquated Joint Theater Level Simulation (JTLS) system
- CCDR Training Requirements Analysis to Build on Capability Based Assessment (CBA) conducted by JWFC TD Group in 2010
  - Purpose
    - Support an Innovative Acquisition approach for the future to reduce Life Cycle Cost
  - Team Orlando Members
    - NAWC TSD - PJM & Instructional System Design (ISD)
    - PEO STRI - Engineering & Cost
    - MITRE - Engineering
  - Plan
    - Interview at a min 3 CCDR staffs based upon their JMETLS
      - **SOUTHCOM**, **CENTCOM**, **PACOM** , **AFRICOM**, **NATO/JWC**, **EUCOM** and/or NORTHCOM
    - Observe exercise planning process
    - Evaluate existing Operational Level Simulation Tools
    - Explore new methodologies, technologies & concepts
    - Identify cost and ROI
    - Recommend acquisition strategy
    - Develop procurement package specification as required

FEA Schedule FY10/11

- Jun-Jul 2010 – Planning meetings
- Aug – JFCOM J7 visit and JTLS demo
- Aug – PANAMAX JTF visit (C2F Norfolk)
- Oct – PACOM visit and interviews
- Nov – JTLS International Users Conference
- Jan – UE 11-3 IPC #2 & Observed UE 11-2 MRX
- Feb – AFRICOM, NATO JWC visits and interviews
- Mar – EUCOM interview
- Jan- Mar – Data/Requirements analysis
- Mar – CCDR Validation
- Mar – Apr – Training Media and Cost analysis
- May – Jun – Out brief and COA selection
- Summer 2011 - Procurement package development?

Observations

- Current OPS mostly Crisis Management (C2 EX) with minor Kinetic incidents
- Best ROI is focus CCDR (Tier 1) training on interfacing with National/Interagency (Tier 0)
- Training exercises are MSEL driven based upon exercise objectives
- Training exercise end state is predetermined to meet exercise objectives
  - Freeplay very limited due to schedule and manpower constraints
- Training objectives dependent on CCDR's AOR
- Drivers for M&S selection for training exercises
  - Cost and M&S Overhead
  - Parochialism for Service M&S
  - Training objectives
  - C4ISR systems to be stimulated
- NATO concerned over current U.S. M&S longevity and support
- M&S AAR capability of little value
  - CCDR briefed daily like real world with no M&S playback
- Misunderstanding between training and analysis requirements
  - Study did not look at analysis requirements (e.g., planning what-ifs)
- WARSIM no magic bullet
  - Limited Air and Maritime models
  - Requires a significant # of role players and CPU for Corps Level Army exercise
  - Deployability is suspect

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Focus Areas

- Low Overhead Technologies
  - PEO STRI Army Low Overhead Sim/Stim Capability (LOSSC)
  - Joint MSEL & Exercise Control Station (JMECS) - No Sim
  - Joint Low Overhead Driver (JLOD)
  - Commercial Constructive sims
  - Virtual World Framework (VWF)
- Crowd sourcing requirements with social media (i.e. facebook, twitter, RSS feeds, YouTube)
  - CCDR social network for planning and execution coming
- Web 3.0 based technology/processes for NexGen Architecture
  - Aging M&S architecture and need for NexGen (5-10yrs)
    - SIMNET 1987, ALSP 1992, DIS 1993, HLA 1998, HLA 1516-2000, HLA 1516-2010, NexGen??
- Constant SME engagement during agile rapid development

COA 1

- Maintain JTLS (Status Quo)
  - Sustain JTLS with a limited O&M budget and accept that the software will become obsolete in the long term (10 years)
  - Plan for a follow on contract and reassess in 4-5 years
  - Meet existing requirements with JTLS in the short term

¤ Pros
- Low overall cost
- Little or no development cost
- Little or no non-recurring costs
- limited sustainment cost
- Continues current line of support – no time required
- Continues support to foreign partners

¤ Cons
- JTLS eventual obsolescence – short term support with long term gap
- Loss of investment in JTLS over time
- “Kicks the can down the road”

COA 2

- Enhance JTLS
  - Maintain and improve JTLS as part of the Joint Force Trainer Toolkit.
  - Integrate JTLS into the existing JLVC architecture and take steps to ensure that the software is viable long term (next 10 years +).
  - Evolve JTLS with other major Joint M&S capabilities to meet current and future requirements.

¤ Pros
- Supports short term & long term
- Minimal non-recurring costs
- Addresses current training gaps
- Reduces supported architectures to 1
- Continues support to foreign partners
- Preserves investment in JTLS – may serve as test bed for Web-Service initiative

¤ Cons
- Does not address consistency within JLVC
- Does not "move with industry" – will not remain current with technology advances
- Limited industry competition (small pool of potential offerors)
- Moderate Costs

COA 3

- Initiate New Competitive Procurement
  - Use JTLS until development for lost capabilities is complete in selected candidate systems.
  - Use agile development approach to address changing and evolving requirements during contract execution
  - Encourage industry to be innovative
  - Portable, gaming technologies, distributed, unclassified

¤ Pros
- ➢ Innovative solution leveraging new and emerging technologies
- ➢ Government owned and controlled
- ➢ Addresses current training gaps
- ➢ "Best of breed"
  - ¤ Lessons learned from previous acquisitions
  - ¤ Lessons learned from previous technology development

¤ Cons
- ➢ Contract risk for government
- ➢ Long term acquisition
- ➢ Likely most expensive
- ➢ Sustainment costs incurred over a period of 7 years

COA 4

- Open Source Approach
  - Use JTLS until development for lost capabilities is complete in selected candidate systems.
  - Develop new Agile core architecture
  - Evaluate Virtual Worlds Framework (VWF) as potential foundation
  - 1 year procurement to build foundation core architecture
    - Leverage Department Semantic Web efforts
    - Develop product under Open Source procedures then put in public domain
    - Government pay for continued CM/QA of the solution

¤ Pros

- Potential lowest life-cycle cost
- Provides early “go/no-go” decision point(s)
- Aligns with industry’s IT business model
- Innovative solution with new/emerging technologies
- Government licensed and controlled
- Addresses current training gaps
- Continues support to foreign partners

∇ Cons

- Highest risk (motivate industry, services, agencies, and coalition partners to participate/contribute)
- Sustainment costs incurred over a period of 5-7 years (QA / CM)
- Socialization commitment to establish community of interest required

COA 4 Technical Approach

- Goal
  - Provide CCDR staff with a practical training application with an agile architecture that employs service oriented architecture (SOA), cloud computing, virtual worlds, semantic web and best commercial practices and technology
- Approach
  - Defense Training Architecture (DTA) provides services to and facilitates information exchange between Joint training applications and interoperability with existing Live, Virtual, and Constructive solutions
  - First year capability, while incomplete with regards to Live and Virtual interoperability, exercises the architecture's data model, services, and communications infrastructure
  - Leverage commercial practices, VWF and gaming technologies
  - Develop loosely coupled services to support future agility and evolutionary development

COA 4 POA&M

- FY13
  - Award BAA Multidisciplinary University Research Initiative (MURI) contract(s) to academic institutions, exhibiting expertise/reputation as knowledgeable in training and education, cloud computing, semantic web, virtual worlds, SOAs and gaming technologies.
  - One academic institution develops the DTA infrastructure and applications for the core architecture in an open collaboration environment (includes academia and industry).
  - One academic institution develops the DTA infrastructure and applications for the core architecture with no collaboration outside of their project team.
  - **If only one MURI award is initiated would reduce cost for COA 4. In this case DTA infrastructure development would be performed as proposed by the winning academic institution.**
- FY14 & FY15
  - Decision point(s) for leadership to assess progress and determine whether to proceed or terminate
  - Open source to public domain for continued enhancement and requirements refinement
  - Go back to COA 2 if chance of failure is to high
- Program Visibility and Incentive Strategy
  - Set up projects in domain space and advertise to development communities that we are looking for specific capabilities (requirements based on 2010 CBA results with consideration for new and emerging requirements)
  - Incentives
    - Incentivize development teams to build software that is DTA compliant

Cost Ground Rules & Assumptions

- Automated Cost Estimator (ACE) tool was used to develop a point estimate which is result of aggregating separate estimates of cost elements
- Ten (10) year snapshot used for comparison to March 2010 study
- Estimate is in Base Year 2011 Dollars
- COA 1 and COA 2 cost estimates accepted as provided in JTLS Study, version 1.01, 5 March 2010
  - Shifted by two years to the right
- Risks assessed at COA level not task level
- Estimate comparison on Contractor costs only

Summary

- Surveyed Combatant Commands to collect CCDR Battle Staff training requirements
- Observed/coordinated with Exercise/Training programs that use JTLS and their associated training audiences
- Using stakeholder inputs and SMEs, defined and evaluated four COAs
- Based on CCDR (Tier 0-Tier 3) objectives and requirements, technical approach, risk, and cost, COA 4 (Open Source Approach) was determined to potentially be the most effective solution with COA 2 as an alternative if COA 4 should fail due to its high risk
- Defined an innovative, cost-effective acquisition strategy for COA 4 that capitalizes on academia involvement and evolves to providing a Government licensed open source solution to be developed through industry, academia,

BACKUP

Takeaways

- Need for better (agile and adaptive) Joint M&S development strategy
  - 1993 WARSIM ORD, 1995 Contract Award, 1997 CBS Baselined, 1999 WARSIM IOC, 2009 WARSIM available
  - 1999 CBS and TACSIM used for U.S. Army CORPS Warfighter
  - 2011 CBS and TACSIM used for U.S. Army CORPS Warfighter
- Current M&S CCDR (T0 through T2) Training Gaps
  - National and Interagency play
  - Crisis Management for C2 EX
    - Non-combatant Evacuation Operations (NEO), Disaster and Humanitarian OPS
  - Crowdsourcing and other emerging technologies (i.e. Facebook, Twitter, RSS feeds, YouTube)
  - Integrated Collaboration tools (lack of standardization of collaboration technologies embedded in M&S)
- C4ISR systems continue to grow and get more complex driving M&S requirements
  - i.e. 1995 ABCS had 5 systems and now they have 10
- Service parochialism with favorite sim drives overhead and cost
  - ROI on increased training capability unsubstantiated
- CCDR validated requirements for a low overhead, unclass, portable Sim solution for taking training into other countries to build regional relations
- CCDR Battle Staff instructional strategy and media delivery methodology validated
- Agile development cycle required

Evaluation Criteria

- Support to J7 Exercise Program/Operational Costs (Weight X2): Merger of Operational Support Costs and extent to which COA support J7 Operational Exercise Mission
- Defense Training Enterprise (DTE) Support (Weight X2): Extent to which the COA supports the DTE as a whole and moves the community forward
- Support to Coalition Allies and CCDR Theater Engagement Strategy: Extent to which the COA supports the existing Joint M&S International User Community and NATO
- Technical Risk: The possibility that the application of software engineering theory, principles, and techniques will fail to yield the right software product.
- Development Costs: Software development costs for given capabilities
- Development Time: Time to implement changes
- Software Sustainment Costs: Costs of sustaining software staff and product lines
- Opportunity Costs: Costs/Impacts on current budgets and staff resources in terms of funding and time
- Competitive Joint Operational War gaming Capability: Extent to which the COA provides a valid Competitive Joint Operational War-game
- Return on Investment: ROI is an estimate of efficiency used to compare the training value returned by a number of different COA investments.
- **Community of Practice: Motivate industry, services, agencies, and coalition partners to participate/contribute.**
- **Adaptability: Ability and agility to accommodate new and emerging requirements.**
- **Government Copyright (Weight X2): Develop product with contractors, using open source procedures and license the software as government copyright**

Bold text indicates new evaluation criteria (from original JTLS study)

COA Assessments

#	Evaluation Criteria	Weight	Maintain JTLS	Enhance JTLS	Initiate New Procurement	Open Source Approach
1	Support to J7 Exercise Program/Operational Costs	2	1	1	1	1
2	Defense Training Environment (DTE) Support	2	-1	1	1	1
3	Support to Coalition Allies and COCOM Theater Engagement Strategy	1	1	1	1	1
4	Technical Risk	1	0	1	0	-1
5	Development Costs	1	1	0	-1	1
6	Development Time	1	1	0	0	1
7	Software Sustainment Costs	1	0	-1	0	1
8	Opportunity Costs	1	1	0	0	0
9	Competitive Joint Operational War gaming Capability	1	0	1	1	1
10	Return on Investment	1	-1	1	1	1
11	Community of Practice	1	1	1	1	0
12	Adaptability	1	-1	0	1	1
13	Government Copyright	2	0	1	1	1
		Composite Rating	3	10	10	12